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ABSTRACT

This study examined the effects that cumulation of slight risks-prenatal up to adolescence-had on cognitive competence and school achievement in Austrian students who had not been identified as being at risk. Data were collected on 91 randomly selected 11- to 13-year-olds who participated in the Vienna Developmental Study, which analyzed conditions that facilitate or hinder the development of social competence and school achievement. The following risk conditions were included in the analysis: biological risks, socioeconomic status, hospitalization, severe strains or life events, and change of teacher. Regression analyses indicated that while school achievement and knowledge could be better explained from risk conditions in girls than in boys, performance could be better explained from risk conditions in boys than in girls. The development of girls seemed to be more influenced by biological conditions and hospitalization in the first year of life, while boys seemed to be more affected by life events and change of teachers, risk conditions that occurred later in life. (MDM)

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# SEX DIFFERENCES IN THE PREDICTIVE POWER OF RISK CONDITIONS FOR COGNITIVE COMPETENCE AND ACADEMIC ACHIEVEMENT

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## ABSTRACT

This study focuses on effects that cumulation of slight risks - prenatal up to adolescence - has on cognitive competence and school achievement in girls and boys who had not been identified as at risk. Data were collected for the Vienna Developmental Study (VDS) which analyzes conditions that facilitate or hinder the development of social competence and school achievement (Spiel, 1996).
The data analyzed for this study describe 91 randomly selected children and their families, 47 girls and 44 boys, all white, middle class. The following risk conditions were included in the analyses: biological risks, socio-economic status, hospitalization, severe strains or life events, and change of teacher. Using multiple regression, the gender-specific impact of risk conditions on outcome variables was analyzed. Results suggested gender specific effects both in portion of variance explained by risk conditions and in the predictive power of risk conditions.

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## THEORETICAL BACKGROUND

Longitudinal studies of children at biological risks have shown great variability in developmental outcome (e.g., Cohen, Parmelee, Sigman, & Beckwith, 1988; Shonkoff, Hauser-Cram, Krauss, & Upshur, 1992). Whereas the prognostic significance of biological risk factors seems to decrease starting at about the age of three, the significance of psychosocial risk factors seems to increase. This applies in particular to performance variables. Boys were shown to be more vulnerable than girls to effects of both biological insults and caregiving deficits (e.g., Goodman, Brumley, Schwartz, & Purcell, 1993; Werner, 1990). However, little is known about the effects that multiple risks have on developmental outcome (Sameroff, Seifer, Baldwin, & Baldwin, 1993; Slee, 1993).

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## PROJECT GOALS

**Identification of gender differences in**

1) **risk conditions,**
2) **developmental outcome variables,**
3) **amount of variance explained by risk conditions, and**
4) **differential predictive power of risk conditions for developmental outcome.**

## SUBJECTS

Data were collected for the **Vienna Developmental Study (VDS)** that analyzes conditions that facilitate or hinder the development of social competence and school achievement (Spiel, 1996). The first wave of data collection was conducted in 1981. A random sample of infants was drawn from day-care centers representatively located in Vienna, Austria. The data analyzed for this study describe 47 girls and 44 boys, all white, middle class. In 1992, mean subject age was 12.00 years, with a range from 11.22 to 13.06 years.

## PREDICTOR VARIABLES

Information about all risk conditions was collected via interviews with parents.

**Biological Risks**. 21 pre- and perinatal risk factors were established in the interviews, including placenta function, gestation age, and birth weight. Because of the random nature of the sample only slight risks were observed. From this information a weighted biological risk score was established.

**Socio-economic Status**. From a number of socio-economic variables, length of maternal education and family income had significant effects on developmental outcome. Therefore, a socio-economic risk score was established that combined both variables.

**Hospitalization in the first year of life**. It was expected that both length of hospitalization and age of child when hospitalized have negative effects on developmental outcome. Previous analyses have shown that only hospitalization in the first year of life has effects on outcome variables.

**Severe Strains and Life Events**. Both, severe strains and life events, e.g. divorce of parents, death of a relative, can have negative effects on developmental outcome. Based on the interviews we established a life event score.

**Change of Teacher**. Entering kindergarten and starting grade school are normative developmental tasks in childhood. However, it was assumed that overly frequent changes of teachers can have negative effects on developmental outcome. Therefore, we counted for each child the number of changes of teachers.

## OUTCOME VARIABLES

**Cognitive Competence** was assessed using the Adaptive Intelligence Test Battery (AID; Kubinger & Wurst, 1988) which is a revision of the Wechsler Intelligence Scale for Children. The AID was divided in two subscales that measure

- **Knowledge**, e.g. everyday knowledge, and
- **Performance**, e.g. digit span - number (parallel to Cattell's crystallized and fluid intelligence dimensions).

The division of the AID-subscales was confirmed by confirmatory factor analysis. As indicated by Kubinger and Wurst (1988), the knowledge subscales are more strongly influenced by parental support than the performance subscales.

**School Achievement** in fourth grade was operationalized using the mean score of the main school subjects, German Language and Mathematics; different school types were taken into account.

For **DATA ANALYSES multiple regressions** were performed separately for boys and girls.

## RESULTS

ad 1) We found neither differences in risk conditions

ad 2) nor in outcome variables between boys and girls.

ad 3) However, regression analyses suggest gender-specific effects in the amount of variance explained by risk conditions, depending on the outcome variable under study (see Figure 1).

ad 4) In addition, the relative impact of risk conditions on developmental outcome was different for boys and girls (see Figures 2, 3 and 4).

## SUMMARY AND DISCUSSION

**In general, results suggest that risk conditions strongly affect developmental outcome both in girls and boys. However there are gender-specific patterns.** While school achievement and knowledge can be better explained from risk conditions in girls than in boys, performance can be better explained from risk conditions in boys than in girls. The development of girls seems to be more influenced by biological conditions and hospitalization in the first year of life - risk conditions that occur early in life - boys seem to be more affected by life events and change of teachers - risk conditions that occur later in life.

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Figure 1: Regression Analyses

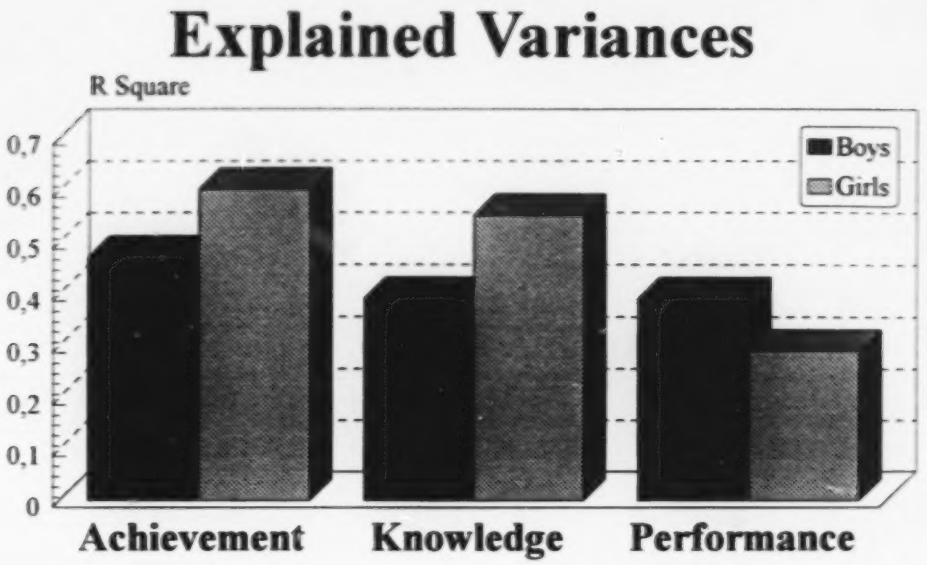
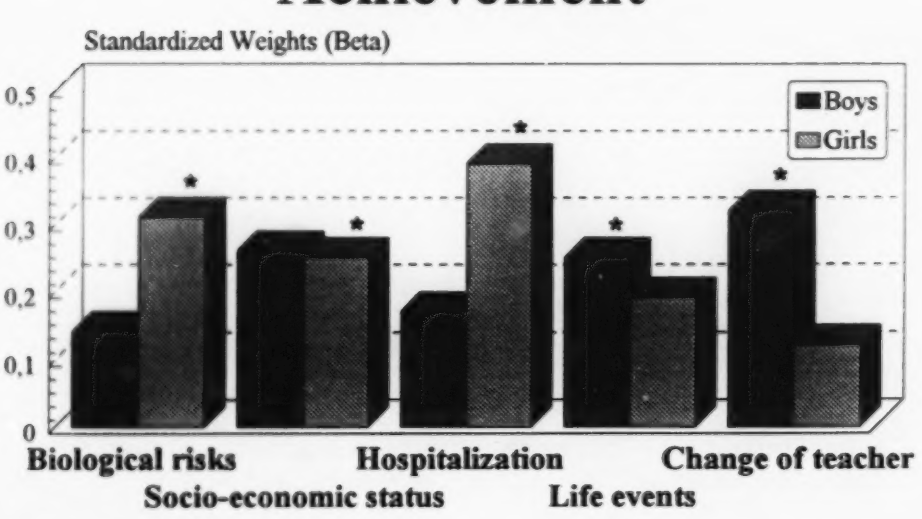
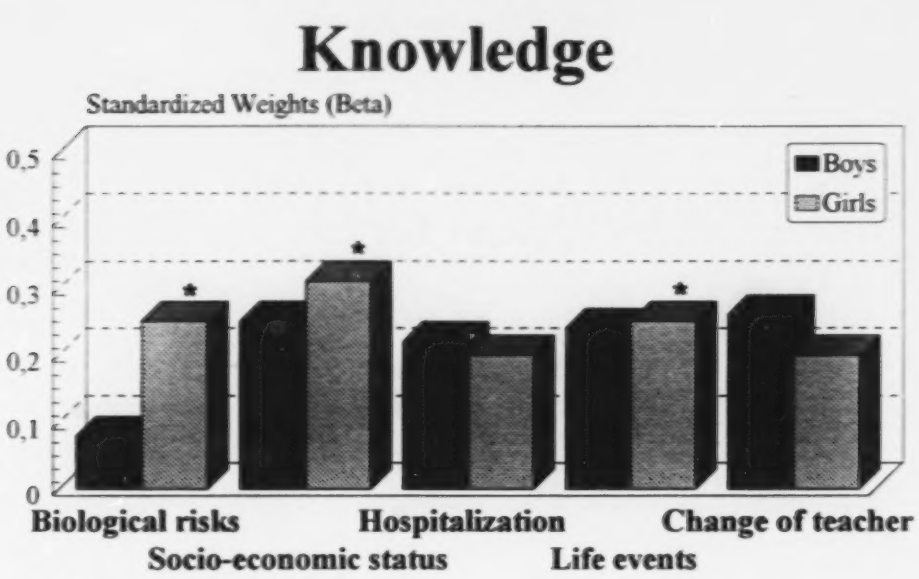



Figure 2: Regression Analysis



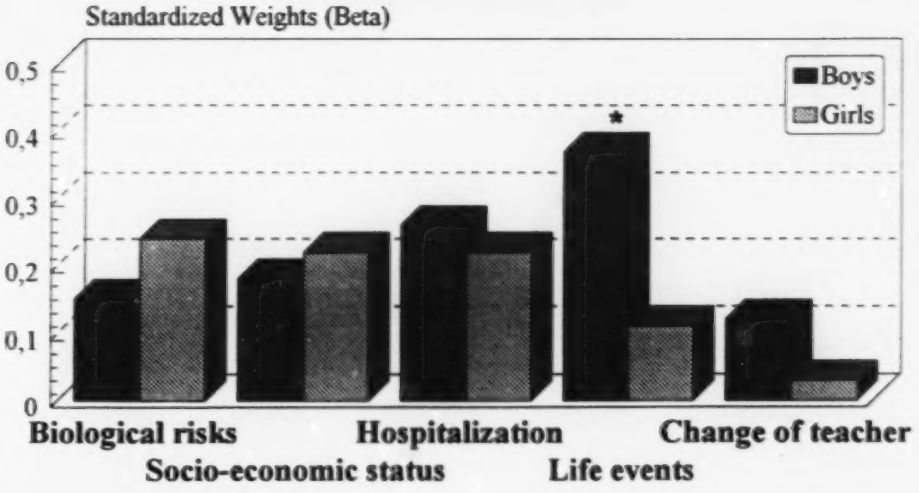

* = sign. with Alpha=5%

Figure 3: Regression Analysis




* = sign. with Alpha=5%

Figure 4: Regression Analysis




* = sign. with Alpha=5%